Comment on Statement for Reason for Allowance

In the first paragraph on page 7, the Examiner states a reason for the indication that Claims 1, 16, 18 and 32-37 are allowable. Applicants agree that these claims are allowable. However, Applicants believe that the Examiner's statement should not be interpreted to mean that the stated reason is the only reason supporting the allowability of Claims 1, 16, 18 and 32-37, and that there is no other reason which separately and independently supports the allowability of some or all of these claims. Moreover, Applicants do not agree with the stated reason to the extent that it uses terminology and/or language which does not appear in the claims or which otherwise differ in some respects from the specific terminology and language that Applicants selected for use in the claims. Applicants believe that the scope and interpretation of the claims should be determined by the terminology and language of the claims themselves, rather than by language selected by the Examiner for purpose of attempting to paraphrase the claimed subject matter.

Claim 4

Claim 4 previously depended from Claims 1 and 3. The foregoing amendments add the limitations of Claims 1 and 3 into Claim 4, thereby placing Claim 4 in independent form. These changes do not alter the scope of Claim 4.

Claim 4 stands rejected under 35 U.S.C. §103 as obvious in view of a proposed combination of teachings from Hornbeck U.S. Patent No. 5,021,663 and Kimura U.S. Patent No. 5,589,688. This ground of rejection is respectfully traversed, for the following reasons.

Claim 4 recites first and second electrodes that absorb thermal energy, that are coupled to a thermally sensitive material, and that are "made from an alloy which includes aluminum and titanium". In the Office Action, the Examiner concedes that Hornbeck does not disclose electrodes made from an alloy of titanium and aluminum. The Examiner therefore turns to Kimura. In particular, the Examiner notes that the elements 5 in Kimura can be made from an alloy of titanium and aluminum, and then asserts that the elements 5 are "electrodes". Applicants respectfully disagree.

Kimura discusses "electrodes" at only two locations, namely in line 50 of column 7 (electrode 2a), and in lines 58-64 of column 8, (electrodes 13-15). There is no indication anywhere in Kimura that the elements 5 are "electrodes". Instead, Kimura indicates at line 6 of column 6 that the elements 5 are "electric wires". In short, Kimura merely discloses an electric wire 5, and indicates that it could be made of any one of a number of different electrically conductive materials, one of which is a titanium-aluminum alloy. Therefore, and contrary to the assertions in the Office Action, Kimura does not disclose the concept of making an "electrode" for a thermally sensitive material from an alloy of aluminum and titanium. Thus, even if Hornbeck is considered in light of Kimura, it would not be obvious from Kimura that the electrodes disclosed in Hornbeck could be made from a titanium aluminum alloy, because Kimura does not disclose any electrodes made of a titanium-aluminum alloy.

A further consideration is that Kimura expressly teaches <u>away</u> from the proposed combination. In this regard, Applicants' Claim 4 recites that the "first and second electrodes are made of a material which absorbs thermal

energy", and then goes on to specify that this material is specifically a titanium-aluminum alloy. The Hornbeck device has electrodes which apparently absorb thermal energy, but they are not made of a titanium-aluminum alloy. Although the electric wires 5 of Kimura are made of titanium-aluminum, Kimura teaches at lines 55-57 of column 6 that the electrical wires 5 are intentionally configured to have a small width and a small thickness, for the specific purpose of minimizing heat conduction. In other words, the electrical wires 5 of Kimura are specifically designed so they do not conduct or absorb any significant amount of thermal energy.

The provisions of MPEP §2141.02 specify that the teachings of a prior art reference must be considered in their entirety, including portions that teach away from the invention. To the extent Kimura teaches that the electric wires 5 should be configured so as to minimize the presence of thermal energy therein, Kimura essentially teaches away from the subject matter of Applicants' Claim 4, which recites that the "first and second electrodes are made of a material which absorbs thermal energy", and "are sufficiently thin so they are substantially absorbing to infrared radiation". It would thus not be obvious under §103 to modify the electrodes of Hornbeck based on the electric wires 5 of Kimura, because Kimura teaches that the electric wires 5 are configured to minimize absorption/conduction of thermal energy, which is directly inconsistent with the express limitations of Claim 4 regarding the thermal characteristics of the recited first and second electrodes.

A separate and independent problem with the §103 rejection of Claim 4 is that it fails to meet one of the requirements for a proper §103 rejection. In particular, even

where a prior art device may be capable of being modified, the Examiner must demonstrate (1) that there is motivation to make the proposed modification, and (2) that the motivation originates in the prior art. For example, MPEP §2143.01 states that the mere fact that references can be combined or modified does not render the resulting combination obvious, unless the prior art suggests the desirability of making the combination. In the present Office Action, the explanation of the §103 rejection of Claim 4 appears in the fourth paragraph on page 5, which merely asserts that "it would have been obvious to one of ordinary skill in the art to provide for electrodes made from such an alloy in the apparatus of Hornbeck for the benefit of electrical connection to the thermally sensitive portion". It is not clear that this sentence actually states a motivation for making the proposed combination, but even assuming that it does, the Office Action does not identify any specific portion of the prior art as the origin of this motivation. Instead, the origin for this motivation is apparently just hindsight reconstruction of the subject matter of Applicants' Claim 4, rather than anything found in the prior art. Consequently, in the absence of a clear explanation from the Examiner as to why there would be motivation which originates in the prior art, the obviousness analysis is incomplete, and therefore defective.

For these reasons, it is respectfully submitted that the subject matter recited in Claim 4 would not be obvious under §103 in view of Hornbeck and Kimura. Claim 4 is therefore believed to be allowable, and notice to that effect is respectfully requested.

Claim 28

Claim 28 has been amended to add a limitation reciting the step of "selecting as a material for said first and second electrodes an alloy which contains titanium and aluminum". The Office Action rejected Claim 28 under 35 U.S.C. §102 as anticipated by Hornbeck. However, the Office Action concedes on page 5 that Hornbeck does not disclose electrodes made from an alloy which includes titanium and aluminum. Thus, taking into account the amendment to Claim 28, amended Claim 28 is clearly not anticipated by Hornbeck. Moreover, for reasons similar to those discussed above in association with Claim 4, it is respectfully submitted that, even if the Hornbeck patent was considered in light of another reference such as Kimura, the subject matter of Claim 28 would not be obvious. Claim 28 is therefore believed to be allowable, and notice to that effect is respectfully requested.

Claim 39

New independent Claim 39 is directed to an apparatus which includes an infrared detector with a plurality of detector elements, where each detector element includes "a thermally sensitive portion which has an electrical characteristic that varies as a function of a temperature of said thermally sensitive portion", and includes "structure which is made of an alloy containing titanium and aluminum, which is thermally coupled to said thermally sensitive portion, which absorbs thermal energy from infrared radiation that impinges on the detector element, and which transfers thermal energy to said thermally sensitive portion".

As mentioned above, the Examiner concedes in the Office Action that the Hornbeck patent does not disclose any part made from an alloy containing titanium and aluminum. Further, the Office Action notes that the Kimura patent discloses electric wires 5 which can be made from a titanium-aluminum alloy. However, as discussed above, Kimura teaches that the wires are intentionally configured so that they do not absorb or conduct any significant amount of thermal energy. Thus, Kimura does not teach or suggest the use of a titanium-aluminum alloy for a part which absorbs thermal energy, and in fact appears to teach away from this concept. Accordingly, it is respectfully submitted that the subject matter recited in Claim 39 is patentably distinct from the art of record, and notice to that effect is respectfully requested.

Claim 47

New independent Claim 47 is a method claim, which includes limitations similar to those discussed above in association with apparatus Claim 39. For example, Claim 47 recites a method of making an infrared detector that has a plurality of detector elements, including the steps of "providing a thermally sensitive portion which has an electrical characteristic that varies as a function of a temperature of said thermally sensitive portion", and "fabricating structure which is made of an alloy containing titanium and aluminum, which is thermally coupled to said thermally sensitive portion, which absorbs thermal energy from infrared radiation that impinges on the detector element, and which transfers thermal energy to said thermally sensitive portion". For reasons similar to those discussed above with

respect to Claim 39, it is respectfully submitted that the subject matter recited in Claim 47 is patentably distinct from the art of record, and notice to that effect is respectfully requested.

Dependent Claims

The foregoing amendments implement adjustments which cause Claims 2, 5-9 and 13 to now depend from Claim 4.

Claims 2, 5-9 and 13, Claims 29-31, Claims 40-46, and Claims 48-54 respectively depend from Claim 4, Claim 28, Claim 39 and Claim 47, and are also believed to be allowable over the art of record, for example for the same reasons discussed above with respect to Claims 4, 28, 39 and 47, respectively.

Conclusion

Based on the foregoing, it is respectfully submitted that all of the pending claims are fully allowable, and favorable reconsideration of this application is therefore respectfully requested. If the Examiner believes that examination of the present application may be advanced in any

way by a telephone conference, the Examiner is invited to telephone the undersigned attorney at (214) 953-6684.

Respectfully submitted,
BAKER BOTTS L.L.P.
Attorneys for Applicant

T. Murray Smith
Reg. No. 30,222
(214) 953-6684

Date: July 24, 2003

BAKER BOTTS L.L.P.
2001 Ross Avenue
Suite 600
Dallas, TX 75201-2980
(214) 953-6500

Enclosures: Marked-up Version of Amended Claims
Amendment Transmittal
Check ($366.00)
Post Card

MARKED UP VERSION OF AMENDED CLAIMS

Please cancel Claims 3 and 12 without prejudice.

4. **(Amended)** [An apparatus according to Claim 3,] **An apparatus, comprising an infrared detector with a plurality of detector elements that each include:**

an amorphous silicon portion which has a selected temperature coefficient of resistance; and

first and second electrodes which are electrically coupled to said amorphous silicon portion at spaced locations thereon, said first and second electrodes and said amorphous silicon portion having a structural configuration which is selected to provide between said first and second electrodes through said amorphous silicon portion at a given temperature a resistance which is selected substantially independently of said temperature coefficient of resistance;

wherein said amorphous silicon portion is a layer having each of said first and second electrodes on one side thereof; and

including a third electrode on a side of said amorphous silicon layer opposite from said first and second electrodes, said third electrode having respective portions which are each aligned with a respective one of said first and second electrodes;

wherein said first and second electrodes are made of a material which absorbs thermal energy, are in thermal communication with said amorphous silicon portion, and are sufficiently thin so that they are substantially absorbing to infrared radiation; and

wherein said electrodes are made from an alloy which includes aluminum and titanium.

5. **(Amended)** An apparatus according to Claim [3] **4**, wherein **said alloy used for** said electrodes [are made from an alloy which] includes approximately equal amounts of aluminum and titanium.

2. **(Twice Amended)** An apparatus according to Claim [12] **4**,

wherein said amorphous silicon portion has a level of doping selected to provide said amorphous silicon portion with said selected temperature coefficient of resistance; and

wherein said structural configuration of said electrodes and said amorphous silicon portion is selected to set said resistance substantially independently of said doping level.

6. **(Twice Amended)** An apparatus according to Claim [12] **4**, wherein said infrared detector includes an integrated circuit, a membrane having therein [an] **said** amorphous silicon portion and said electrodes, and structure which supports said membrane at a location spaced above said integrated circuit and which electrically couples each of said first and second electrodes to said integrated circuit.

13. **(Twice Amended)** An apparatus according to Claim [12] **4**, including spaced first and second layers made of a material which is electrically insulating and substantially transparent to infrared radiation, said amorphous silicon layer and said electrodes being disposed between said first and second layers.

28. **(Amended)** A method of making an infrared detector having a plurality of detector elements, comprising the steps of:

providing an amorphous silicon layer which has a selected temperature coefficient of resistance;

fabricating first and second electrodes which are at spaced locations on one side of said amorphous silicon layer and which are electrically coupled to said amorphous silicon layer, including **the step of selecting as a material for said first and second electrodes an alloy which contains titanium and aluminum, and** the step of structurally configuring said first and second electrodes and said amorphous silicon layer so as to provide between said first and second electrodes through said amorphous silicon layer at a given temperature a resistance selected substantially independently of said temperature coefficient of resistance; and

fabricating a third electrode **from said alloy** on a side of said amorphous silicon layer opposite from said first and second electrodes, said third electrode having respective portions which are each aligned with a respective one of said first and second electrodes.

38. (New) A method according to Claim 28, wherein said step of selecting said alloy includes selecting said alloy to have approximately equal amounts of aluminum and titanium.

39. (New) An apparatus comprising an infrared detector having a plurality of detector elements that each include:

a thermally sensitive portion which has an electrical characteristic that varies as a function of a temperature of said thermally sensitive portion; and

structure which is made of an alloy containing titanium and aluminum, which is thermally coupled to said thermally sensitive portion, which absorbs thermal energy from infrared radiation that impinges on the detector element, and which transfers thermal energy to said thermally sensitive portion.

40. (New) An apparatus according to Claim 39,

wherein said structure includes first and second electrodes that are electrically coupled to said thermally sensitive portion at spaced locations thereon, said first and second electrodes being electrically and thermally conductive, and being sufficiently thin so that they absorb infrared radiation; and

including circuitry which is electrically coupled to said first and second electrodes, and which is capable of measuring said electrical characteristic of said thermally sensitive portion through said electrodes.

41. (New) An apparatus according to Claim 40,

wherein said infrared detector includes a substrate having said circuitry therein;

wherein each said detector element includes a membrane supported in spaced relation to said substrate and having therein said thermally sensitive portion and said first and second electrodes;

wherein said electrodes are each have a thickness in the range of approximately 100 to 200 Angstroms; and

wherein said alloy includes approximately equal amounts of titanium and aluminum.

42. (New) An apparatus according to Claim 40, wherein said thermally sensitive portion includes amorphous silicon.

43. (New) An apparatus according to Claim 39,

including first and second electrodes that are electrically coupled to said thermally sensitive portion at spaced locations thereon, said first and second electrodes being electrically conductive;

including circuitry which is electrically coupled to said first and second electrodes, said circuitry being capable of measuring said electrical characteristic of said thermally sensitive portion through said electrodes; and

wherein said structure includes a layer which is made of said alloy, which is spaced from said electrodes, and which is sufficiently thin so that it absorbs infrared radiation.

44. (New) An apparatus according to Claim 43,

wherein said infrared detector includes a substrate having said circuitry therein; and

wherein each said detector element includes a membrane supported in spaced relation to said substrate and having therein said thermally sensitive portion, said layer, and said first and second electrodes.

45. (New) An apparatus according to Claim 43, wherein said layer is a further electrode, said first and second electrodes being disposed on one side of said thermally

sensitive portion and said further electrode being disposed on an opposite side of said thermally sensitive portion.

46. (New) An apparatus according to Claim 43, wherein said thermally sensitive portion includes amorphous silicon.

47. (New) A method of making an infrared detector having a plurality of detector elements, comprising the steps of:

providing a thermally sensitive portion which has an electrical characteristic that varies as a function of a temperature of said thermally sensitive portion; and

fabricating structure which is made of an alloy containing titanium and aluminum, which is thermally coupled to said thermally sensitive portion, which absorbs thermal energy from infrared radiation that impinges on the detector element, and which transfers thermal energy to said thermally sensitive portion.

48. (New) A method according to Claim 47,

wherein said step of fabricating said structure includes the step of fabricating first and second electrodes that are electrically coupled to said thermally sensitive portion at spaced locations thereon, said first and second electrodes being electrically and thermally conductive, and being sufficiently thin so that they absorb infrared radiation; and

including the step of fabricating circuitry within said infrared detector which is electrically coupled to said first and second electrodes, and which is capable of measuring said electrical characteristic of said thermally sensitive portion through said electrodes.

49. (New) A method according to Claim 48, including the steps of:

configuring said infrared detector to have a substrate with said circuitry therein;

configuring each said detector element to include a membrane supported in spaced relation to said substrate and having therein said thermally sensitive portion and said first and second electrodes;

configuring each of said electrodes to have a thickness in the range of approximately 100 to 200 Angstroms; and

configuring said alloy to have approximately equal amounts of titanium and aluminum.

50. (New) A method according to Claim 48, including the step of configuring said thermally sensitive portion to include amorphous silicon.

51. (New) A method according to Claim 47, including the steps of:

fabricating first and second electrodes which are electrically coupled to said thermally sensitive portion at spaced locations thereon, said first and second electrodes being electrically conductive;

configuring said infrared detector to include circuitry which is electrically coupled to said first and second electrodes, said circuitry being capable of measuring said electrical characteristic of said thermally sensitive portion through said electrodes; and

configuring said structure of each said detector element to include a layer which is made of said alloy, which is

spaced from said electrodes, and which is sufficiently thin so that it absorbs infrared radiation.

52. (New) A method according to Claim 51, including the step of configuring said infrared detector to have a substrate with said circuitry therein; and

configuring each said detector element to have a membrane which is supported in spaced relation to said substrate and which has therein said thermally sensitive portion, said layer, and said first and second electrodes.

53. (New) A method according to Claim 51, wherein said step of configuring said structure includes the step of configuring said layer to be a further electrode which is disposed on a side of said thermally sensitive portion opposite from said first and second electrodes.

54. (New) A method according to Claim 51, including the step of configuring said thermally sensitive portion to include amorphous silicon.